The Sacramento Valley area includes about 800 mi^2 in northwestern Arizona and is bounded on the west by the Black and Buck Mountains and on the east by the Cerbat and Hualapai Mountains. The Black Mountains consist mainly of volcanic rocks; the Buck, Cerbat, and Hualapai Mountains consist of igneous, metamorphic, and volcanic rocks (Gillespie and Bentley, 1971, pl. 1). Sacramento Valley slopes gently southward and is underlain by alluvium and volcanic rocks to depths of more than 4,000 ft. Gillespie and Bentley (1971, p. 10-15) divided the alluvium into three units—older, intermediate, and younger alluvium—and the volcanic rocks into two units—older and younger volcanic rocks.

The main water-bearing unit is the moderately consolidated older alluvium, which consists of fragments of granite, schist, gneiss, and volcanic rocks in a silty clay or sandy matrix interbedded with weakly consolidated tuff and agglomerate. The older alluvium yields 20 to 1,300 gal/min of water to wells, and specific capacities for four wells ranged from 3.9 to 11.9 (gal/min)/ft of drawdown (Gillespie and Bentley, 1971, p. 24). The composition of the intermediate alluvium is similar to that of the older alluvium; however, it is more weakly consolidated than the older alluvium. The intermediate alluvium is capable of storing and transmitting large quantities of water, but, because the unit generally is above the water table, it is not an important source of ground water. Near the mountains, however, the unit is saturated, and wells yield as much as 50 gal/min. The younger alluvium consists of shallow piedmont and stream deposits. The piedmont deposits are not known to yield water to wells, and the stream deposits generally yield less than 5 gal/min; the water is used mainly for livestock supplies (Gillespie and Bentley, 1971, p. 14). Depth to water in the stream deposits varies seasonally but generally is less than 100 ft below the land surface.

The older volcanic rocks consist of a thick sequence of andesite and latite flows and tuff beds. The unit transmits some water through fracture zones but is generally too fine grained or too tightly cemented to yield water to wells. The younger volcanic rocks consist of basaltic and rhyolitic rocks and tuff. In the Kingman area the younger volcanic rocks are about 1,400 ft thick and yield from less than 1 to 300 gal/min. The specific capacities for two wells in T. 21 N., R. 17 W., were 2.4 and 2.9 (gal/min)/ft of drawdown (Gillespie and Bentley, 1971, p. 24). Two fault zones intersect near Kingman and form two distinct ground-water reservoirs. One reservoir is north of Kingman and one is near its center. Through the 1950's, the municipal water supply was obtained from the reservoirs, but declining well yields in the 1960's, especially north of Kingman, prompted development of the water supply in the older alluvium in nearby Hualapai Valley. Most of the municipal water supply for Kingman now is obtained from Hualapai Valley.

The igneous and metamorphic rocks furnish water to springs and generally yield less than 5 gal/min to wells from fracture zones. Although spring discharge generally is less than 10 gal/min, in places the springs are the main source of water for livestock.

In the Sacramento Valley area ground water is used mainly for industrial and municipal supplies, and no ground water is used for irrigation. During 1965-78, the estimated ground-water pumpage was 81,000 acre-ft, and in 1978 the estimated ground-water pumpage was 8,000 acre-ft. Ground-water withdrawal has had little effect on water levels in most of the area; however, water-level declines have occurred in places where ground water is withdrawn for industrial or municipal supplies. In the industrial area in T. 21 N., R. 18 W., water levels have declined about 25 ft since 1964 (hydrograph C).

Ground water generally is of good chemical quality, and the dissolved-solids concentrations ranged from 293 to 801 mg/L (milligrams per liter) and averaged about 460 mg/L in 16 water samples collected in 1978-79. The specific-conductance values shown on the map indicate that the dissolved-solids concentrations in most water samples are within this range. Specific conductance varies with the concentration of ions in solution, and the dissolved-solids values may be estimated by multiplying the specific conductance by 0.6. According to Gillespie and Bentley (1971, p. 29, 33), the water is highly mineralized in a few areas in and near the mountains; near the Cerbat Mountains in secs. 3 and 9, T. 23 N., R. 18 W., the water from four wells contained 1,431 to 2,365 mg/L dissolved solids.

The maximum contaminant level for dissolved solids in public water supplies is 500 mg/L, as proposed in the secondary drinking-water regulations of the U.S. Environmental Protection Agency (1977b, p. 17146) in accordance with provisions of the Safe Drinking Water Act (Public Law 93-523). The U.S. Environmental Protection Agency (1977a, b) has established national regulations and guidelines for the quality of water provided by public water systems. The regulations are either primary or secondary. Primary drinking-water regulations limit the contaminants in drinking water that have been shown to affect human health. Secondary drinking-water regulations apply to contaminants that affect esthetic quality. The primary regulations are enforceable either by the Environmental Protection Agency or by the States; in contrast, the secondary regulations are not Federally enforceable. The secondary regulations are intended as guidelines for the States. The regulations express limits as "maximum contaminant levels," where contaminant means any physical, chemical, biological, or radiological substance or matter in water.

The maximum contaminant level for fluoride in public water supplies differs according to the annual average maximum daily air temperature (Bureau of Water Quality Control, 1978, p. 6). The amount of water consumed by humans, and therefore the amount of fluoride ingested, depends partly on air temperature. In the Sacramento Valley area the annual average maximum daily air temperature is about 76°F, and the maximum contaminant level for fluoride is 1.6 mg/L. Fluoride concentrations ranged from 0.2 to 3.1 mg/L, but most of the water samples contained less than 1.6 mg/L.

The hydrologic data on which this map is based are available, for the most part, in computer-printout form and may be consulted at the Arizona Department of Water Resources, 99 East Virginia, Phoenix, and at U.S. Geological Survey offices in: Federal Building, 301 West Congress Street, Tucson; Valley Center, Suite 1880, Phoenix; and 1940 South Third Avenue, Yuma. Material from which copies can be made at private expense is available at the Tucson, Phoenix, and Yuma offices of the U.S. Geological Survey.

SELECTED REFERENCES

Bureau of Water Quality Control, 1978, Drinking water regulations for the State of Arizona: Arizona Department of Health Services duplicated report, 39 p.

Gillespie, J. B., and Bentley, C. B., 1971, Geohydrology of Hualapai and Sacramento Valleys, Mohave County, Arizona: U.S. Geological Survey Water-Supply Paper 1899-H, 37 p.

Gillespie, J. B., Bentley, C. B., and Kam, William, 1966, Basic hydrologic data of the Hualapai, Sacramento, and Big Sandy Valleys, Mohave County, Arizona: Arizona State Land Department Water-Resources Report 26, 39 p.

National Academy of Sciences and National Academy of Engineering, 1973 [1974], Water quality criteria, 1972: U.S. Environmental Protection Agency Report, EPA-R3-73-033, 594 p.

U.S. Environmental Protection Agency, 1976 [1978], Quality criteria for water: U.S. Environmental Protection Agency publication, 256 p.

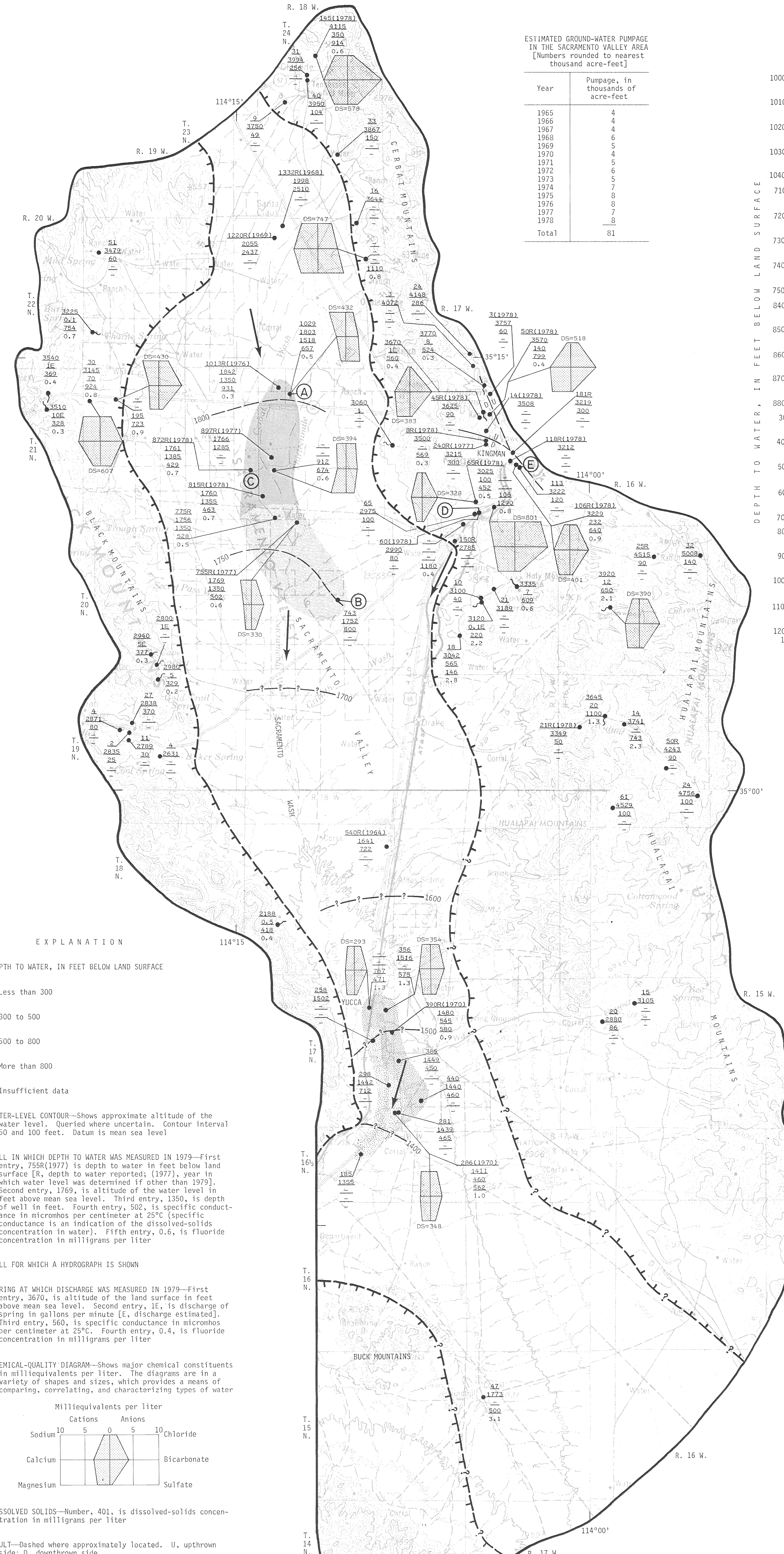
________1977a, National interim primary drinking water regulations: U.S. Environmental Protection Agency Report, EPA-570/9-76-003, 159 p.

________1977b, National secondary drinking water regulations: Federal Register, v. 42, no. 62, March 31, 1977, p. 17143-17147.

CONVERSION FACTORS

For readers who prefer to use metric units rather than inch-pound units, the conversion factors for the terms used in this report are listed below:

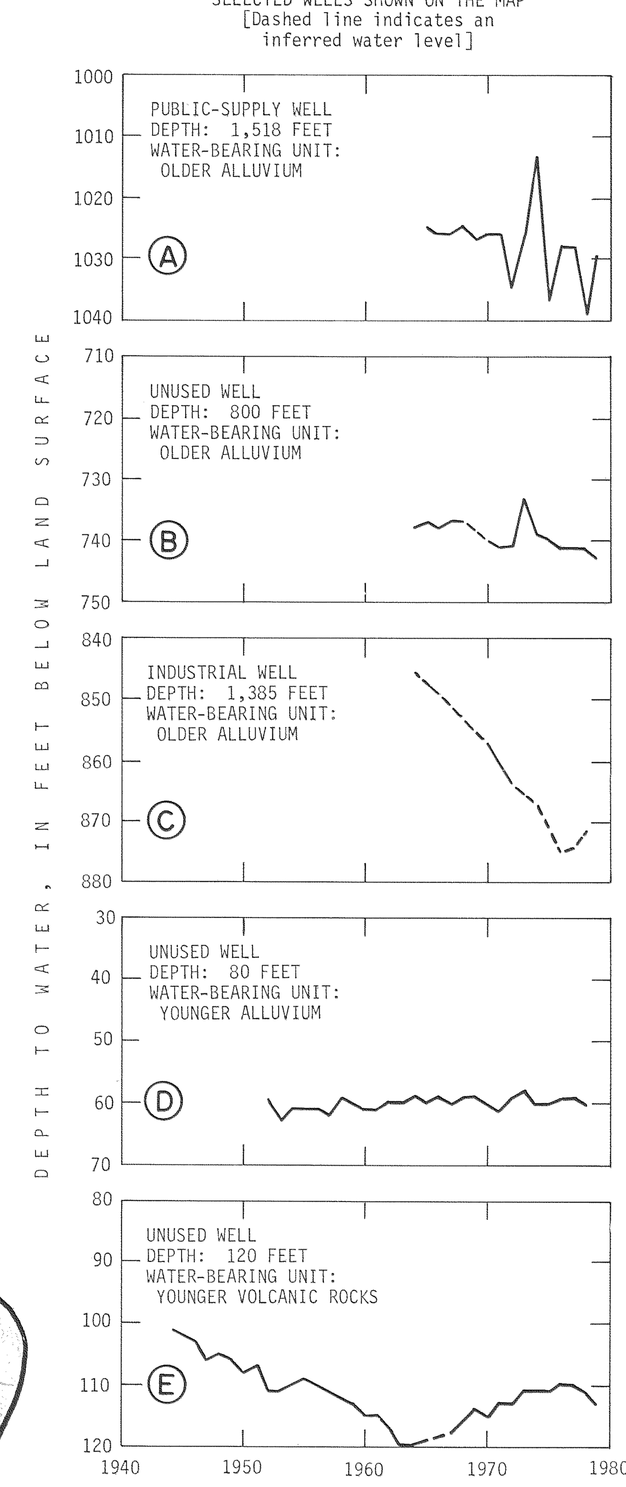
Multiply inch-pound unit	By	To obtain metric unit
foot (ft)	0.3048	meter (m)
square mile (mi^2)	2.590	square kilometer (km^2)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
gallon per minute (gal/min)	0.06309	liter per second (L/s)
gallon per minute per foot [(gal/min)/ft]	0.2070	liter per second per meter [(L/s)/m]



ESTIMATED GROUND-WATER PUMPAGE IN THE SACRAMENTO VALLEY AREA
[Numbers rounded to nearest thousand acre-feet]

Year	Pumpage, in thousands of acre-feet
1965	4
1966	4
1967	4
1968	6
1969	5
1970	4
1971	5
1972	6
1973	5
1974	7
1975	8
1976	8
1977	7
1978	8
Total	81

HYDROGRAPHS OF THE WATER LEVEL IN SELECTED WELLS SHOWN ON THE MAP
[Dashed line indicates an inferred water level]



EXPLANATION

DEPTH TO WATER, IN FEET BELOW LAND SURFACE

Less than 300

300 to 500

500 to 800

More than 800

Insufficient data

— — 1700 —?— WATER-LEVEL CONTOUR—Shows approximate altitude of the water level. Queried where uncertain. Contour interval 50 and 100 feet. Datum is mean sea level

755R(1977) / 1769 / 1350 / 502 / 0.6 WELL IN WHICH DEPTH TO WATER WAS MEASURED IN 1979—First entry, 755R(1977) is depth to water in feet below land surface [R, depth to water reported; (1977), year in which water level was determined if other than 1979]. Second entry, 1769, is altitude of the water level in feet above mean sea level. Third entry, 1350, is depth of well in feet. Fourth entry, 502, is specific conductance in micromhos per centimeter at 25°C (specific conductance is an indication of the dissolved-solids concentration in water). Fifth entry, 0.6, is fluoride concentration in milligrams per liter

C WELL FOR WHICH A HYDROGRAPH IS SHOWN

3670 / 1E / 560 / 0.4 SPRING AT WHICH DISCHARGE WAS MEASURED IN 1979—First entry, 3670, is altitude of the land surface in feet above mean sea level. Second entry, 1E, is discharge of spring in gallons per minute [E, discharge estimated]. Third entry, 560, is specific conductance in micromhos per centimeter at 25°C. Fourth entry, 0.4, is fluoride concentration in milligrams per liter

CHEMICAL-QUALITY DIAGRAM—Shows major chemical constituents in milliequivalents per liter. The diagrams are in a variety of shapes and sizes, which provides a means of comparing, correlating, and characterizing types of water

Milliequivalents per liter
Cations Anions
Sodium 10 5 0 5 10 Chloride
Calcium Bicarbonate
Magnesium Sulfate

DS=401 DISSOLVED SOLIDS—Number, 401, is dissolved-solids concentration in milligrams per liter

U / D FAULT—Dashed where approximately located. U, upthrown side; D, downthrown side

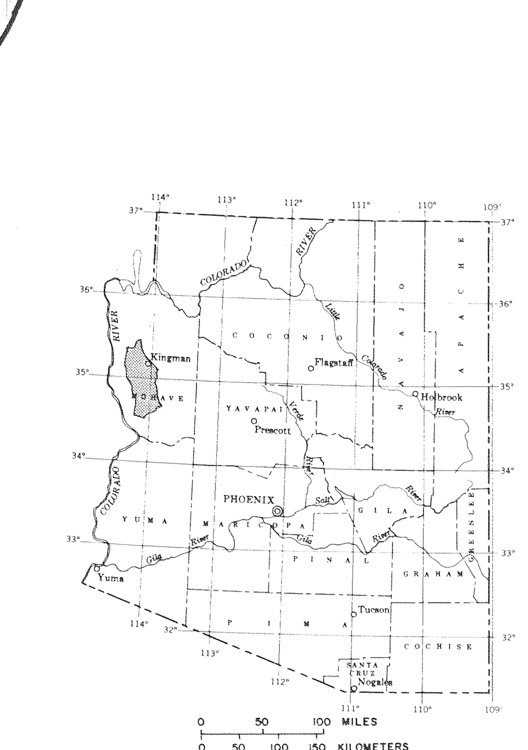
APPROXIMATE BOUNDARY OF THE MAIN WATER-BEARING UNIT—The main water-bearing unit is the moderately consolidated older alluvium, which consists of fragments of granite, schist, gneiss, and volcanic rocks in a silty clay or sandy matrix interbedded with weakly consolidated tuff and agglomerate. Queried where uncertain

GENERALIZED DIRECTION OF GROUND-WATER FLOW

ARBITRARY BOUNDARY OF GROUND-WATER AREA

5 0 5 MILES
5 0 5 10 KILOMETERS

TOPOGRAPHIC CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100-FOOT INTERVALS
DATUM IS MEAN SEA LEVEL



AREA OF REPORT (SHADED)

BASE FROM U.S. GEOLOGICAL SURVEY
KINGMAN 1:250,000, 1954,
NEEDLES 1:250,000, 1956, AND
PRESCOTT 1:250,000, 1954

STRUCTURAL GEOLOGY (FAULTS) FROM
GILLESPIE AND BENTLEY (1971)

MAP SHOWING GROUND-WATER CONDITIONS IN THE SACRAMENTO VALLEY AREA, MOHAVE COUNTY, ARIZONA—1979

BY
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